

SEQUENCE LISTING

<110> Narva, Kenneth
Merlo, Donald

<120> Polynucleotides, Pesticidal Proteins, and Novel Methods of Using Them

<130> MA-708CDC1

<150> US 09/850,351
<151> 2001-05-07

<150> US 09/073,898
<151> 1998-05-06

<150> US 08/690,780
<151> 1997-10-30

<150> US 60/029,848
<151> 1996-10-30

<160> 27

<170> PatentIn version 3.1

<210> 1
<211> 29
<212> DNA
<213> Artificial Sequence

<220>
<223> 339 forward primer

<400> 1
garccrtgga aagcaaataa taaraatgc 29

<210> 2
<211> 33
<212> DNA
<213> Artificial Sequence

<220>
<223> 339 reverse primer

<400> 2
aaarttatct ccccawgctt catctccatt ttg 33

<210> 3
<211> 2375
<212> DNA
<213> Bacillus thuringiensis

<400> 3
atgaacaaga ataatactaa attaagcaca agagccttac caagttttat tgattatattt 60

aatggcattt atggatttgc cactgggtatc aaagacatta tgaacatgat ttttaaaacg	120
gatacaggtg gtgatctaac cctagacgaa attttaaaga atcagcagtt actaaatgat	180
atttctggta aattggatgg ggtgaatgga agcttaaag atcttatcgc acagggaaac	240
ttaaatacag aattatctaa ggaaatatta aaaattgcaa atgaacaaaa tcaagtttta	300
aatgatgtta ataacaaact cgatgcgata aatacgatgc ttcgggtata tctacctaaa	360
attacctcta tgttgagtga tgtaatgaaa caaaattatg cgctaagtct gcaaatagaa	420
tacttaagta aacaattgca agagatttct gataagttgg atattattaa tgtaaatgta	480
cttattaact ctacacttac tgaaattaca cctgcgtatc aaaggattaa atatgtgaac	540
gaaaaatttg aggaattaac ttttgctaca gaaactagtt caaaagtaaa aaaggatggc	600
tctcctgcaa atattcttga tgagttaact gagttaactg aactagcgaa aagtgtaca	660
aaaaatgatg tggatggttt tgaattttac cttaatatcat tccacgatgt aatggtagga	720
aataatttat tgggcggttc agctttaaaa actgcacgg aattaattac taaagaaaat	780
gtgaaaacaa gtggcagtga ggtcggaat gtttataact tcttaattgt attaacagct	840
ctgcaagcaa aagcttttct tactttaaca acatgccgaa aattattagg cttagcagat	900
attgattata cttctattat gaatgaacat ttaaataagg aaaaagagga atttagagta	960
aacatctcc ctacactttc taatactttt tctaactcta attatgcaaa agttaaagga	1020
agtgatgaag atgcaaagat gattgtggaa gctaaaccag gacatgcatt gattgggttt	1080
gaaattagta atgattcaat tacagtatta aaagtatatg aggctaagct aaaacaaaat	1140
tatcaagtcg ataaggattc cttatcgga gttatttatg gtgatatgga taaattattg	1200
tgcccagatc aatctgaaca aatctattat acaaataaca tagtatttcc aatgaatat	1260
gtaattacta aaattgattt cactaaaaaa atgaaaactt taagatatga ggtaacagcg	1320
aatttttatg attcttctac aggagaaatt gacttaaata agaaaaaagt agaatcaagt	1380
gaagcggagt ataaaacgtt aagtgcta at gatgatggg tgtatatgcc gttaggtgtc	1440
atcagtga aa ctttttgac tccgattaat gggtttgcc tccaagctga tgaaaattca	1500
agattaatta ctttaacatg taaatcatat ttaagagaac tactgctagc aacagactta	1560
agcaataaag aaactaaatt gatcgccccg ccaagtgggt ttattagcaa tattgtagag	1620
aacgggtcca tagaagagga caatttagag ccgtggaaag caaataataa gaatgcgtat	1680
gtagatcata caggcggagt gaatggaact aaagctttat atgttcataa ggacggagga	1740
atttcacaat ttattggaga taatttaaaa ccgaaaactg agtatgtaat ccaatatact	1800

```

gttaaaggaa aaccttctat tcatttaata gatgaaaata ctggatatat tcattatgaa 1860
gatacaaata ataatttaga agattatcaa actattaata aacgttttac tacaggaact 1920
gatttaaagg gagtgtattht aattttaaaa agtcaaaatg gagatgaagc ttggggagat 1980
aactttatta ttttggaat tagtccttct gaaaagttat taagtccaga attaattaat 2040
acaaataatt ggacgagtag gggatcaact aatattagcg gtaatacact cactctttat 2100
cagggaggag gagggattct aaaacaaaac cttcaattag atagtttttc aacttataga 2160
gtgtatthtt ctgtgtccgg agatgctaata gtaaggatta gaaattctag ggaagtgtta 2220
tttgaaaaaa gatatatgag cgggtgctaaa gatgtttctg aaatgttcac tacaaaattt 2280
gagaaagata acttttatat agagctttct caagggaata atttatatgg tggtcctatt 2340
gtacatthtt acgatgtctc tattaagtaa cccaa 2375

```

```

<210> 4
<211> 790
<212> PRT
<213> Bacillus thuringiensis

```

```

<400> 4

```

```

Met Asn Lys Asn Asn Thr Lys Leu Ser Thr Arg Ala Leu Pro Ser Phe
1          5          10          15

```

```

Ile Asp Tyr Phe Asn Gly Ile.Tyr Gly Phe Ala Thr Gly Ile Lys Asp
20          25          30

```

```

Ile Met Asn Met Ile Phe Lys Thr Asp Thr Gly Gly Asp Leu Thr Leu
35          40          45

```

```

Asp Glu Ile Leu Lys Asn Gln Gln Leu Leu Asn Asp Ile Ser Gly Lys
50          55          60

```

```

Leu Asp Gly Val Asn Gly Ser Leu Asn Asp Leu Ile Ala Gln Gly Asn
65          70          75          80

```

```

Leu Asn Thr Glu Leu Ser Lys Glu Ile Leu Lys Ile Ala Asn Glu Gln
85          90          95

```

```

Asn Gln Val Leu Asn Asp Val Asn Asn Lys Leu Asp Ala Ile Asn Thr
100         105         110

```

Met Leu Arg Val Tyr Leu Pro Lys Ile Thr Ser Met Leu Ser Asp Val
 115 120 125

Met Lys Gln Asn Tyr Ala Leu Ser Leu Gln Ile Glu Tyr Leu Ser Lys
 130 135 140

Gln Leu Gln Glu Ile Ser Asp Lys Leu Asp Ile Ile Asn Val Asn Val
 145 150 155 160

Leu Ile Asn Ser Thr Leu Thr Glu Ile Thr Pro Ala Tyr Gln Arg Ile
 165 170 175

Lys Tyr Val Asn Glu Lys Phe Glu Glu Leu Thr Phe Ala Thr Glu Thr
 180 185 190

Ser Ser Lys Val Lys Lys Asp Gly Ser Pro Ala Asn Ile Leu Asp Glu
 195 200 205

Leu Thr Glu Leu Thr Glu Leu Ala Lys Ser Val Thr Lys Asn Asp Val
 210 215 220

Asp Gly Phe Glu Phe Tyr Leu Asn Thr Phe His Asp Val Met Val Gly
 225 230 235 240

Asn Asn Leu Phe Gly Arg Ser Ala Leu Lys Thr Ala Ser Glu Leu Ile
 245 250 255

Thr Lys Glu Asn Val Lys Thr Ser Gly Ser Glu Val Gly Asn Val Tyr
 260 265 270

Asn Phe Leu Ile Val Leu Thr Ala Leu Gln Ala Lys Ala Phe Leu Thr
 275 280 285

Leu Thr Thr Cys Arg Lys Leu Leu Gly Leu Ala Asp Ile Asp Tyr Thr
 290 295 300

Ser Ile Met Asn Glu His Leu Asn Lys Glu Lys Glu Glu Phe Arg Val
 305 310 315 320

Asn Ile Leu Pro Thr Leu Ser Asn Thr Phe Ser Asn Pro Asn Tyr Ala
 325 330 335

Lys Val Lys Gly Ser Asp Glu Asp Ala Lys Met Ile Val Glu Ala Lys
 340 345 350

Pro Gly His Ala Leu Ile Gly Phe Glu Ile Ser Asn Asp Ser Ile Thr
 355 360 365

Val Leu Lys Val Tyr Glu Ala Lys Leu Lys Gln Asn Tyr Gln Val Asp
 370 375 380

Lys Asp Ser Leu Ser Glu Val Ile Tyr Gly Asp Met Asp Lys Leu Leu
 385 390 395 400

Cys Pro Asp Gln Ser Glu Gln Ile Tyr Tyr Thr Asn Asn Ile Val Phe
 405 410 415

Pro Asn Glu Tyr Val Ile Thr Lys Ile Asp Phe Thr Lys Lys Met Lys
 420 425 430

Thr Leu Arg Tyr Glu Val Thr Ala Asn Phe Tyr Asp Ser Ser Thr Gly
 435 440 445

Glu Ile Asp Leu Asn Lys Lys Lys Val Glu Ser Ser Glu Ala Glu Tyr
 450 455 460

Lys Thr Leu Ser Ala Asn Asp Asp Gly Val Tyr Met Pro Leu Gly Val
 465 470 475 480

Ile Ser Glu Thr Phe Leu Thr Pro Ile Asn Gly Phe Gly Leu Gln Ala
 485 490 495

Asp Glu Asn Ser Arg Leu Ile Thr Leu Thr Cys Lys Ser Tyr Leu Arg
 500 505 510

Glu Leu Leu Leu Ala Thr Asp Leu Ser Asn Lys Glu Thr Lys Leu Ile
 515 520 525

Val Pro Pro Ser Gly Phe Ile Ser Asn Ile Val Glu Asn Gly Ser Ile
 530 535 540

Glu Glu Asp Asn Leu Glu Pro Trp Lys Ala Asn Asn Lys Asn Ala Tyr
 545 550 555 560

Val Asp His Thr Gly Gly Val Asn Gly Thr Lys Ala Leu Tyr Val His
565 570 575

Lys Asp Gly Gly Ile Ser Gln Phe Ile Gly Asp Asn Leu Lys Pro Lys
580 585 590

Thr Glu Tyr Val Ile Gln Tyr Thr Val Lys Gly Lys Pro Ser Ile His
595 600 605

Leu Ile Asp Glu Asn Thr Gly Tyr Ile His Tyr Glu Asp Thr Asn Asn
610 615 620

Asn Leu Glu Asp Tyr Gln Thr Ile Asn Lys Arg Phe Thr Thr Gly Thr
625 630 635 640

Asp Leu Lys Gly Val Tyr Leu Ile Leu Lys Ser Gln Asn Gly Asp Glu
645 650 655

Ala Trp Gly Asp Asn Phe Ile Ile Leu Glu Ile Ser Pro Ser Glu Lys
660 665 670

Leu Leu Ser Pro Glu Leu Ile Asn Thr Asn Asn Trp Thr Ser Thr Gly
675 680 685

Ser Thr Asn Ile Ser Gly Asn Thr Leu Thr Leu Tyr Gln Gly Gly Arg
690 695 700

Gly Ile Leu Lys Gln Asn Leu Gln Leu Asp Ser Phe Ser Thr Tyr Arg
705 710 715 720

Val Tyr Phe Ser Val Ser Gly Asp Ala Asn Val Arg Ile Arg Asn Ser
725 730 735

Arg Glu Val Leu Phe Glu Lys Arg Tyr Met Ser Gly Ala Lys Asp Val
740 745 750

Ser Glu Met Phe Thr Thr Lys Phe Glu Lys Asp Asn Phe Tyr Ile Glu
755 760 765

Leu Ser Gln Gly Asn Asn Leu Tyr Gly Gly Pro Ile Val His Phe Tyr
770 775 780

Asp Val Ser Ile Lys Pro
785 790

<210> 5
<211> 2370
<212> DNA
<213> *Bacillus thuringiensis*

<400> 5
atgaacaaga ataatactaa attaagcaca agagccttac caagttttat tgattatattt 60
aatggcattt atggatttgc cactgggtatc aaagacatta tgaacatgat ttttaaaacg 120
gatacaggtg gtgatctaac cctagacgaa attttaaaga atcagcagtt actaaatgat 180
atttctggta aattggatgg ggtgaatgga agcttaaagt atcttatcgc acagggaaac 240
ttaaatacag aattatctaa agaaatatta aaaattgcaa atgaacaaaa tcaagtttta 300
aatgatgttg ataacaaact cgatgcgata aatacagatgc ttccgggtata tctacctaaa 360
attacctcta tgttgagtga tgtaatgaaa caaaattatg cgctaagtct gcaaatagaa 420
tacttaagta aacaattgca agagatttct gataagttgg atattattaa tgtaaattgta 480
cttattaact ctacacttac tgaaattaca cctgcgtatc aaaggattaa atatgtgaac 540
gaaaaatttg aggaattaac ttttgctaca gaaactagtt caaaagtaaa aaaggatggc 600
tctcctgcag atattcttga tgagttaact gagttaaactg aactagcgaa aagtgttaaca 660
aaaaatgatg tggatggttt tgaattttac cttaatacat tccacgatgt aatggtagga 720
aataatttat tcgggcgttc agcttttaaaa actgcatcgg aattaattac taaagaaaat 780
gtgaaaacaa gtggcagtga ggtcggaaat gtttataact tcttaattgt attaacagct 840
ctgcaagcaa aagcttttct tactttaaca acatgccgaa aattattagg cttagcagat 900
attgattata cttctattat gaatgaacat ttaaataagg aaaaagagga atttagagta 960
aacatcctcc ctacactttc taatactttt tctaactcta attatgcaaa agttaagga 1020
agtgatgaag atgcaaagat gattgtggaa gctaaaccag gacatgcatt gggtgggttt 1080
gaaattagta atgattcaat tacagtatta aaagtatatg aggctaagct aaaacaaaat 1140
tatcaagttg ataaggattc cttatcggaa gttattttatg gtgatatgga taaattattg 1200
tgcccagatc aatctgaaca aatctattat acaaataaca tagtatttcc aatgaatat 1260
gtaattacta aaattgattt tactaaaaaa atgaaaactt taagatatga ggtaacagcg 1320
aatttttatg attcttctac aggagaaatt gacttaaata agaaaaaagt agaatacagt 1380
gaagcggagt atagaacgtt aagtgctaatt gatgatggag tgtatatgcc gttaggtgtc 1440

atcagtgaac catttttgac tccgattaat gggtttggcc tccaagctga tgaaaattca 1500
 agattaatta ctttaacatg taaatcatat ttaagagaac tactgctagc aacagactta 1560
 agcaataaag aaactaaatt gatcgccccg cccagtgggt ttattaaaaa tattgtagag 1620
 aacgggtcca tagaagagga caatttagag ccgtggaaag caaataataa gaatgagtat 1680
 gtagatcata caggcggagt gaatggract aaagctttat atgttcataa ggacggagga 1740
 atttcacaat ttattggaga taagttaaaa ccgaaaactg agtatgtaat ccaatatact 1800
 gttaaaggaa aaccttctat tcatttataa gatgaaaata ctggatatat tcattatgaa 1860
 gatacaataa ataatttaga agattatcaa actattacta aacgttttac tacaggaact 1920
 gatttaaagg gagtgtatct aattttataa agtcaaatg gagatgaagc ttggggagat 1980
 aactttatta ttttggaaat tagtccttct gaaaagttaa taagtccaga attaattaat 2040
 acaataaatt ggacgagtag gggatcaact aatattagcg gtaatacact cactctttat 2100
 caggaggagc gaggaattct aaaacaaaac cttcaattag atagtttttc aacttataga 2160
 gtgtatcttt ctgtgtcccg agatgctaata gtaaggatta gaaattctag ggaagtgtta 2220
 tttgaaaaaa gatatatgag cggtgctaaa gatgtttctg aaattttcac tacaaaattt 2280
 gggaaagata acttttatat agagctttct caaggggata atttaaattg tggccctatt 2340
 gtacagtttc ccgatgtctc tattaagtaa 2370

<210> 6

<211> 789

<212> PRT

<213> *Bacillus thuringiensis*

<400> 6

Met Asn Lys Asn Asn Thr Lys Leu Ser Thr Arg Ala Leu Pro Ser Phe
 1 5 10 15

Ile Asp Tyr Phe Asn Gly Ile Tyr Gly Phe Ala Thr Gly Ile Lys Asp
 20 25 30

Ile Met Asn Met Ile Phe Lys Thr Asp Thr Gly Gly Asp Leu Thr Leu
 35 40 45

Asp Glu Ile Leu Lys Asn Gln Gln Leu Leu Asn Asp Ile Ser Gly Lys
 50 55 60

Leu Asp Gly Val Asn Gly Ser Leu Asn Asp Leu Ile Ala Gln Gly Asn
65 70 75 80

Leu Asn Thr Glu Leu Ser Lys Glu Ile Leu Lys Ile Ala Asn Glu Gln
85 90 95

Asn Gln Val Leu Asn Asp Val Asp Asn Lys Leu Asp Ala Ile Asn Thr
100 105 110

Met Leu Arg Val Tyr Leu Pro Lys Ile Thr Ser Met Leu Ser Asp Val
115 120 125

Met Lys Gln Asn Tyr Ala Leu Ser Leu Gln Ile Glu Tyr Leu Ser Lys
130 135 140

Gln Leu Gln Glu Ile Ser Asp Lys Leu Asp Ile Ile Asn Val Asn Val
145 150 155 160

Leu Ile Asn Ser Thr Leu Thr Glu Ile Thr Pro Ala Tyr Gln Arg Ile
165 170 175

Lys Tyr Val Asn Glu Lys Phe Glu Glu Leu Thr Phe Ala Thr Glu Thr
180 185 190

Ser Ser Lys Val Lys Lys Asp Gly Ser Pro Ala Asp Ile Leu Asp Glu
195 200 205

Leu Thr Glu Leu Thr Glu Leu Ala Lys Ser Val Thr Lys Asn Asp Val
210 215 220

Asp Gly Phe Glu Phe Tyr Leu Asn Thr Phe His Asp Val Met Val Gly
225 230 235 240

Asn Asn Leu Phe Gly Arg Ser Ala Leu Lys Thr Ala Ser Glu Leu Ile
245 250 255

Thr Lys Glu Asn Val Lys Thr Ser Gly Ser Glu Val Gly Asn Val Tyr
260 265 270

Asn Phe Leu Ile Val Leu Thr Ala Leu Gln Ala Lys Ala Phe Leu Thr
275 280 285

Leu Thr Thr Cys Arg Lys Leu Leu Gly Leu Ala Asp Ile Asp Tyr Thr
 290 295 300

Ser Ile Met Asn Glu His Leu Asn Lys Glu Lys Glu Glu Phe Arg Val
 305 310 315 320

Asn Ile Leu Pro Thr Leu Ser Asn Thr Phe Ser Asn Pro Asn Tyr Ala
 325 330 335

Lys Val Lys Gly Ser Asp Glu Asp Ala Lys Met Ile Val Glu Ala Lys
 340 345 350

Pro Gly His Ala Leu Val Gly Phe Glu Ile Ser Asn Asp Ser Ile Thr
 355 360 365

Val Leu Lys Val Tyr Glu Ala Lys Leu Lys Gln Asn Tyr Gln Val Asp
 370 375 380

Lys Asp Ser Leu Ser Glu Val Ile Tyr Gly Asp Met Asp Lys Leu Leu
 385 390 395 400

Cys Pro Asp Gln Ser Glu Gln Ile Tyr Tyr Thr Asn Asn Ile Val Phe
 405 410 415

Pro Asn Glu Tyr Val Ile Thr Lys Ile Asp Phe Thr Lys Lys Met Lys
 420 425 430

Thr Leu Arg Tyr Glu Val Thr Ala Asn Phe Tyr Asp Ser Ser Thr Gly
 435 440 445

Glu Ile Asp Leu Asn Lys Lys Lys Val Glu Ser Ser Glu Ala Glu Tyr
 450 455 460

Arg Thr Leu Ser Ala Asn Asp Asp Gly Val Tyr Met Pro Leu Gly Val
 465 470 475 480

Ile Ser Glu Thr Phe Leu Thr Pro Ile Asn Gly Phe Gly Leu Gln Ala
 485 490 495

Asp Glu Asn Ser Arg Leu Ile Thr Leu Thr Cys Lys Ser Tyr Leu Arg
 500 505 510

Glu Leu Leu Leu Ala Thr Asp Leu Ser Asn Lys Glu Thr Lys Leu Ile
 515 520 525

Val Pro Pro Ser Gly Phe Ile Lys Asn Ile Val Glu Asn Gly Ser Ile
 530 535 540

Glu Glu Asp Asn Leu Glu Pro Trp Lys Ala Asn Asn Lys Asn Glu Tyr
 545 550 555 560

Val Asp His Thr Gly Gly Val Asn Gly Thr Lys Ala Leu Tyr Val His
 565 570 575

Lys Asp Gly Gly Ile Ser Gln Phe Ile Gly Asp Lys Leu Lys Pro Lys
 580 585 590

Thr Glu Tyr Val Ile Gln Tyr Thr Val Lys Gly Lys Pro Ser Ile His
 595 600 605

Leu Lys Asp Glu Asn Thr Gly Tyr Ile His Tyr Glu Asp Thr Asn Asn
 610 615 620

Asn Leu Glu Asp Tyr Gln Thr Ile Thr Lys Arg Phe Thr Thr Gly Thr
 625 630 635 640

Asp Leu Lys Gly Val Tyr Leu Ile Leu Lys Ser Gln Asn Gly Asp Glu
 645 650 655

Ala Trp Gly Asp Asn Phe Ile Ile Leu Glu Ile Ser Pro Ser Glu Lys
 660 665 670

Leu Leu Ser Pro Glu Leu Ile Asn Thr Asn Asn Trp Thr Ser Thr Gly
 675 680 685

Ser Thr Asn Ile Ser Gly Asn Thr Leu Thr Leu Tyr Gln Gly Gly Arg
 690 695 700

Gly Ile Leu Lys Gln Asn Leu Gln Leu Asp Ser Phe Ser Thr Tyr Arg
 705 710 715 720

Val Tyr Phe Ser Val Ser Gly Asp Ala Asn Val Arg Ile Arg Asn Ser
 725 730 735

Arg Glu Val Leu Phe Glu Lys Arg Tyr Met Ser Gly Ala Lys Asp Val
 740 745 750

Ser Glu Ile Phe Thr Thr Lys Phe Gly Lys Asp Asn Phe Tyr Ile Glu
 755 760 765

Leu Ser Gln Gly Asn Asn Leu Asn Gly Gly Pro Ile Val Gln Phe Pro
 770 775 780

Asp Val Ser Ile Lys
 785

<210> 7
 <211> 2375
 <212> DNA
 <213> *Bacillus thuringiensis*

<400> 7
 atgaacaaga ataatactaa attaagcaca agagccttac caagttttat tgattatattt 60
 aatggcattt atggatttgc cactggtatc aaagacatta tgaacatgat ttttaaaacg 120
 gatacaggtg gtgatctaac cctagacgaa attttaaaga atcagcagtt actaaatgat 180
 atttctggta aattggatgg ggtgaatgga agcttaaagt atcttatcgc acagggaaac 240
 ttaaatacag aattatctaa ggaaatatta aaaattgcaa atgaacaaaa tcaagtttta 300
 aatgatgtta ataacaaact cgatgcgata aatacagatgc ttcgggtata tctacctaaa 360
 attacctcta tgttgagtga tgtaatgaaa caaaattatg cgctaagtct gcaaatagaa 420
 tacttaagta aacaattgca agagatttct gataagttgg atattattaa tgtaaagtga 480
 cttattaact ctacacttac tgaaattaca cctgcgtatc aaaggattaa atatgtgaac 540
 gaaaaatttg aggaattaac ttttgctaca gaaactagtt caaaagtaaa aaaggatggc 600
 tctcctgcag atattcttga tgagttaact gagttaactg aactagcgaa aagtgttaaca 660
 aaaaatgatg tggatgggtt tgaattttac cttaatacat tccacgatgt aatggtagga 720
 aataatttat tcgggcgttc agctttaaaa actgcacgga aattaattac taaagaaaat 780
 gtgaaaacaa gtggcagtga ggtcgggaaat gtttataact tcttaattgt attaacagct 840
 ctgcaagcaa aagcttttct tactttaaca acatgccgaa aattattagg cttagcagat 900
 attgattata cttctattat gaatgaacat ttaaataagg aaaaagagga atttagagta 960
 aacatcctcc ctacactttc taatactttt tctaactcta attatgcaaa agttaagga 1020
 agtgatgaag atgcaaagat gattgtggaa gctaaaccag gacatgcatt gattgggttt 1080

gaaattagta atgattcaat tacagtatta aaagtatatg aggctaagct aaaacaaaat 1140
 tatcaagtcg ataaggattc cttatcggaa gttatttatg gtgatatgga taaattattg 1200
 tgcccagatc aatctgaaca aatctattat acaaataaca tagtatttcc aaatgaatat 1260
 gtaattacta aaattgattt cactaaaaaa atgaaaactt taagatatga ggtaacagcg 1320
 aatttttatg attcttctac aggagaaatt gacttaaata agaaaaaagt agaatcaagt 1380
 gaagcggagt atagaacggt aagtgctaata gatgatgggg tgtatatgcc gttaggtgtc 1440
 atcagtgaaa cttttttgac tccgattaat gggtttggcc tccaagctga tgaaaattca 1500
 agattaatta ctttaacatg taaatcatat ttaagagaac tactgctagc aacagactta 1560
 agcaataaag aaactaaatt gatygtcccg ccaagtgggt ttattagcaa tattgtagag 1620
 aacgggtcca tagaagagga caatttagag ccgtggaaag caaataataa gaatgcgtat 1680
 gtagatcata caggcggagt gaatggaact aaagctttat atgttcataa ggacggagga 1740
 atttcacaat ttattggaga taagttaaaa ccgaaaactg agtatgtaat ccaatatact 1800
 gttaaaggaa aaccttctat tcatttaaaa gatgaaaata ctggatatat tcattatgaa 1860
 gatacaaata ataatttaga agattatcaa actattaata aacgttttac tacaggaact 1920
 gatttaaagg gagtgtattt aatttttaaaa agtcaaaatg gagatgaagc ttggggagat 1980
 aactttatta ttttggaat tagtccttct gaaaagttat taagtccaga attaattaat 2040
 acaaataatt ggacgagtac gggatcaact aatattagcg gtaatacact cactctttat 2100
 cagggaggac gagggattct aaaacaaaac cttcaattag atagtttttc aacttataga 2160
 gtgtattttt ctgtgtccgg agatgctaata gtaaggatta gaaattctag ggaagtgtta 2220
 tttgaaaaaa gatatatgag cggtgctaaa gatgtttctg aaatgttcac tacaaaattt 2280
 gagaaagata acttttatat agagctttct caagggaata atttatatgg tggctctatt 2340
 gtacattttt acgatgtctc tattaagtaa cccaa 2375

<210> 8
 <211> 790
 <212> PRT
 <213> *Bacillus thuringiensis*
 <400> 8

Met Asn Lys Asn Asn Thr Lys Leu Ser Thr Arg Ala Leu Pro Ser Phe
 1 5 10 15

Ile Asp Tyr Phe Asn Gly Ile Tyr Gly Phe Ala Thr Gly Ile Lys Asp
20 25 30

Ile Met Asn Met Ile Phe Lys Thr Asp Thr Gly Gly Asp Leu Thr Leu
35 40 45

Asp Glu Ile Leu Lys Asn Gln Gln Leu Leu Asn Asp Ile Ser Gly Lys
50 55 60

Leu Asp Gly Val Asn Gly Ser Leu Asn Asp Leu Ile Ala Gln Gly Asn
65 70 75 80

Leu Asn Thr Glu Leu Ser Lys Glu Ile Leu Lys Ile Ala Asn Glu Gln
85 90 95

Asn Gln Val Leu Asn Asp Val Asn Asn Lys Leu Asp Ala Ile Asn Thr
100 105 110

Met Leu Arg Val Tyr Leu Pro Lys Ile Thr Ser Met Leu Ser Asp Val
115 120 125

Met Lys Gln Asn Tyr Ala Leu Ser Leu Gln Ile Glu Tyr Leu Ser Lys
130 135 140

Gln Leu Gln Glu Ile Ser Asp Lys Leu Asp Ile Ile Asn Val Asn Val
145 150 155 160

Leu Ile Asn Ser Thr Leu Thr Glu Ile Thr Pro Ala Tyr Gln Arg Ile
165 170 175

Lys Tyr Val Asn Glu Lys Phe Glu Glu Leu Thr Phe Ala Thr Glu Thr
180 185 190

Ser Ser Lys Val Lys Lys Asp Gly Ser Pro Ala Asp Ile Leu Asp Glu
195 200 205

Leu Thr Glu Leu Thr Glu Leu Ala Lys Ser Val Thr Lys Asn Asp Val
210 215 220

Asp Gly Phe Glu Phe Tyr Leu Asn Thr Phe His Asp Val Met Val Gly
225 230 235 240

Asn Asn Leu Phe Gly Arg Ser Ala Leu Lys Thr Ala Ser Glu Leu Ile
 245 250 255

Thr Lys Glu Asn Val Lys Thr Ser Gly Ser Glu Val Gly Asn Val Tyr
 260 265 270

Asn Phe Leu Ile Val Leu Thr Ala Leu Gln Ala Lys Ala Phe Leu Thr
 275 280 285

Leu Thr Thr Cys Arg Lys Leu Leu Gly Leu Ala Asp Ile Asp Tyr Thr
 290 295 300

Ser Ile Met Asn Glu His Leu Asn Lys Glu Lys Glu Glu Phe Arg Val
 305 310 315 320

Asn Ile Leu Pro Thr Leu Ser Asn Thr Phe Ser Asn Pro Asn Tyr Ala
 325 330 335

Lys Val Lys Gly Ser Asp Glu Asp Ala Lys Met Ile Val Glu Ala Lys
 340 345 350

Pro Gly His Ala Leu Ile Gly Phe Glu Ile Ser Asn Asp Ser Ile Thr
 355 360 365

Val Leu Lys Val Tyr Glu Ala Lys Leu Lys Gln Asn Tyr Gln Val Asp
 370 375 380

Lys Asp Ser Leu Ser Glu Val Ile Tyr Gly Asp Met Asp Lys Leu Leu
 385 390 395 400

Cys Pro Asp Gln Ser Glu Gln Ile Tyr Tyr Thr Asn Asn Ile Val Phe
 405 410 415

Pro Asn Glu Tyr Val Ile Thr Lys Ile Asp Phe Thr Lys Lys Met Lys
 420 425 430

Thr Leu Arg Tyr Glu Val Thr Ala Asn Phe Tyr Asp Ser Ser Thr Gly
 435 440 445

Glu Ile Asp Leu Asn Lys Lys Lys Val Glu Ser Ser Glu Ala Glu Tyr
 450 455 460

Arg Thr Leu Ser Ala Asn Asp Asp Gly Val Tyr Met Pro Leu Gly Val
465 470 475 480

Ile Ser Glu Thr Phe Leu Thr Pro Ile Asn Gly Phe Gly Leu Gln Ala
485 490 495

Asp Glu Asn Ser Arg Leu Ile Thr Leu Thr Cys Lys Ser Tyr Leu Arg
500 505 510

Glu Leu Leu Leu Ala Thr Asp Leu Ser Asn Lys Glu Thr Lys Leu Ile
515 520 525

Val Pro Pro Ser Gly Phe Ile Ser Asn Ile Val Glu Asn Gly Ser Ile
530 535 540

Glu Glu Asp Asn Leu Glu Pro Trp Lys Ala Asn Asn Lys Asn Ala Tyr
545 550 555 560

Val Asp His Thr Gly Gly Val Asn Gly Thr Lys Ala Leu Tyr Val His
565 570 575

Lys Asp Gly Gly Ile Ser Gln Phe Ile Gly Asp Lys Leu Lys Pro Lys
580 585 590

Thr Glu Tyr Val Ile Gln Tyr Thr Val Lys Gly Lys Pro Ser Ile His
595 600 605

Leu Lys Asp Glu Asn Thr Gly Tyr Ile His Tyr Glu Asp Thr Asn Asn
610 615 620

Asn Leu Glu Asp Tyr Gln Thr Ile Asn Lys Arg Phe Thr Thr Gly Thr
625 630 635 640

Asp Leu Lys Gly Val Tyr Leu Ile Leu Lys Ser Gln Asn Gly Asp Glu
645 650 655

Ala Trp Gly Asp Asn Phe Ile Ile Leu Glu Ile Ser Pro Ser Glu Lys
660 665 670

Leu Leu Ser Pro Glu Leu Ile Asn Thr Asn Asn Trp Thr Ser Thr Gly
675 680 685

Ser Thr Asn Ile Ser Gly Asn Thr Leu Thr Leu Tyr Gln Gly Gly Arg
690 695 700

Gly Ile Leu Lys Gln Asn Leu Gln Leu Asp Ser Phe Ser Thr Tyr Arg
705 710 715 720

Val Tyr Phe Ser Val Ser Gly Asp Ala Asn Val Arg Ile Arg Asn Ser
725 730 735

Arg Glu Val Leu Phe Glu Lys Arg Tyr Met Ser Gly Ala Lys Asp Val
740 745 750

Ser Glu Met Phe Thr Thr Lys Phe Glu Lys Asp Asn Phe Tyr Ile Glu
755 760 765

Leu Ser Gln Gly Asn Asn Leu Tyr Gly Gly Pro Ile Val His Phe Tyr
770 775 780

Asp Val Ser Ile Lys Pro
785 790

<210> 9
<211> 47
<212> DNA
<213> Artificial Sequence

<220>
<223> 158C2 Primer A

<400> 9
gctctagaag gaggttaactt atgaacaaga ataatactaa attaagc 47

<210> 10
<211> 2035
<212> DNA
<213> Bacillus thuringiensis

<400> 10
atgaacaaga ataatactaa attaagcgca agggcctacc gagttttatt gattatttta 60
atggcattta tggatttgcc actggtatca aagacattat gaatatgatt tttaaaacgg 120
atacaggtgg taatctaacc ttagacgaaa tcctaaagaa tcagcagtta cttaatgaga 180
tttctggtaa attggatggg gtaaatggga gcttaaataga tcttatcgca cagggaaact 240
taaatacaga attagctaag caaatcttaa aagttgcaaa tgaacaaaat caagttttta 300
atgatgttaa taacaaacta gactgcgata aatacgatgc ttaaaatata tctacctaaa 360

attcacatct atgttaagtg atgtactgaa gccaaaatta tgtgcttaag tcttgcaa	420
tggaattacc ttttaagtaac atctgcacct tggcaagaaa tctccgacaa gctagatatt	480
attaacgtaa atgtgcttat taactctacg cttactgaaa ttacacctgc gtatcaacga	540
attaaatatg tgaatgaaaa atttgacgat ttaacttttg ctacagaaaa cactttaaaa	600
gtaaaaaagg atagctctcc tgctgatatt cttgacgagt taactgaatt aactgaacta	660
gcgaaaagtg ttacaaaaaa tgacgtggat gggtttgaat tttaccttaa tacattccat	720
gatgtaatgg tgggaaataa tttattcggt cggttcagctt taaaaactgc ttcggaatta	780
attgctaaag aaaatgtgaa aacaagtggc agtgaagtag gaaatgttta taatttctta	840
attgtattaa cagctctaca agcaaaagct tttcttactt taacaacatg ccgaaaatta	900
ttaggcttag cagatattga ttatacttct atcatgaatg agcattttaa taaggaaaaa	960
gaggaattta gagtaaacad ccttcccaca ctttctaata ctttttctaa tctaattat	1020
gcaaaagcta agggaagtaa tgaagatata aagatgattg tggaagctaa accaggatat	1080
gttttggttg gatttgaaat gagcaataat tcaattacag tattaaaagc atatcaagct	1140
aagctaaaaa aagattatca aattgataag gattcgttat cagaaataat atatagtacg	1200
tgatacggat aaattattat gtccggatca atctgaacaa tatattatac aaagaacata	1260
gcatttccaa atgaatatgt tattactaaa attgctttta ctaaaaaaat gaacagttta	1320
aggtatgagg cgacagcgaa tttttatgat tcttctacag gggatattga tctaaataag	1380
acaaaagtag aatcaagtga agcggagtat agtatgctaa aagctagtga tgatgaagtt	1440
tacatgccgc taggtcttat cagtgaacaa tttttaaatc caattaatgg atttaggctt	1500
gcagtcgatg aaaattccag actagtaact ttaacatgta gatcatattt aagagagaca	1560
ttgttagcga cagattttaa taataaagaa actaaattga ttgtcccacc taatgttttt	1620
attagcaata ttgtagagaa tggaaatata gaaatggaca ccttagaacc atggaaggca	1680
aataatgaga atgcgaatgt agattattca ggcggagtga atggaactag agctttatat	1740
gttcataagg atggtgaatt ctcacatttt attggagaca agttgaaatc taaaacagaa	1800
tacttgattc gatatatgtg aaaaggaaaa gcttctattt ttttaaaaga tgaaagaaat	1860
gaaaattaca tttacgagga tacaataat aatttagaag attatcaaac tattactaaa	1920
cgttttacta caggaactga ttcgacagga ttttatttat tttttactac tcaagatgga	1980
aatgaagctt ggggagacac tttttttctc tagaaagagg taacttatga acaag	2035

<210> 11
 <211> 21
 <212> DNA
 <213> Artificial Sequence

<220>

<223> 49C Primer A

<400> 11

catcctccct acactttcta a

21

<210> 12
 <211> 950
 <212> DNA
 <213> *Bacillus thuringiensis*

<400> 12

aaactagagg gagtgataag gatgcgaaaa tcattatgga agctaaacct ggatatgctt	60
tagttggatt tgaaataagt aaggattcaa ttgcagtatt aaaagtttat caggcaaagc	120
taaaacacaa ctatcaaatt gataaggatt cgttatcaga aattgtttat ggtgatatag	180
ataaattatt atgtccggat caatctgaac aaatgtatta taaaataaa atagcatttc	240
caaatgaata tgttatcact aaaattgctt ttactaaaaa actgaacagt ttaagatatg	300
aggtcacagc gaatttttat gactcttcta caggagatat tgatctaaat aagaaaaaaa	360
tagaatcaag tgaagcggag tttagtatgc taaatgctaa taatgatggg gtttatatgc	420
cgataggtac tataagtga acatttttga ctccaattaa tggatttggc ctcgtagtcg	480
atgaaaattc aagactagta actttgacat gtaaatacata tttaagagag acattgttag	540
caacagactt aagtaataaa gaaactaaac tgattgtccc acctaatggg tttattagca	600
atattgtaga aaatgggaac ttagagggag aaaacttaga gccgtgggaa agcaaataac	660
aaaaatgcgt atgtagatca taccggagggt gtaaattgaa ctaaagtttt atatgttcat	720
gaggatgggtg agttctcaca atttattggg gataaattga aattgaaaac agaatatgta	780
attccatata ttgtaaaggg gaaagctgct atttatttaa aagatgaaaa aaatggggat	840
tacatatcat gaagaaacat cataatgcaa ttgaagattt ttccagctgt aacttcaata	900
atgattttcg catccttatc atccctctag ctttttcata ataggataga	950

<210> 13
 <211> 20
 <212> DNA
 <213> Artificial Sequence

<220>

<223> 49C Primer B

<400> 13

aaattatgcg ctaagtctgc

20

<210> 14

<211> 19

<212> DNA

<213> Artificial Sequence

<220>

<223> 49C Primer C

<400> 14

ttgatccgga cataataat

19

<210> 15

<211> 176

<212> DNA

<213> Bacillus thuringiensis

<400> 15

gtaaattatg cgctaagtct gcaccttttt tcaactgttac taaacatcac ttttcctata 60

tccccttagc tcttatggat tattgagcaa acttatcttg ttaattacta ctccccatca 120

tatgctaaac aaaaaccaa caaacattat ctattatatg tccggatcaa aatgta 176

<210> 16

<211> 2361

<212> DNA

<213> Bacillus thuringiensis

<400> 16

atgcaaaaaa ataataaatt aagtgtaaaag gctttaccaa gtttcattga ttattttaat 60

ggaatttacg gattcgccac tggatcaaaa gatattatga acatgatttt taaaacgaat 120

acaggagggg atctaaccct agacgaaata ttaaaaaatc aacagttact taatgagatt 180

tctggcaaac tggatggagt gaatggcagc ttaaatgatc ttctcgaca aggaaacttg 240

gatactgaat tatctaagga aatattaaaa attgcaaatg aacagaataa ggttttaaat 300

gatgtaaata caaagcttga tgcgataaat ttaatgctta acacatattt acctaaaatt 360

acttctatgt taagtgatgt aatgaaacaa aattatgcat taggtttgca aatagaatac 420

ctaagcaaac aattaaagga aatttcagat aagctagatg ttattaatgt aaatgtactc 480

attaactcta cacttactga aattacacct gcctatcaaa ggattaaata tgtaaatgaa 540

aaatttgaag cattaacctc tgctacagaa accaatttaa aaacaaaaca agatagctct 600

catacagata ttcttgatga gttaacagag ctaacggaac tagcgaaaag tgtaacaaaa	660
aatgacgtgg atggctttga attttacctt aatacattcc acgatgtaat gattgggaat	720
aatctatttg gacgttcagc tttaaaaaca gcctcggaat taattgcgaa agaaaatttg	780
aaaacaagtg gcagtgaggt aggaaatggt tataatttct taattgtatt aacagctctg	840
caagcaaaag cttttcttac ttttaactaca tgccggaaat tattgggctt agcagatatt	900
gattatactc ctattatgaa tgaacaccta aataaagaaa aagaggaatt tagagtgaac	960
atccttecta cactttctaa tactttttct aatcctaatt atgaaaaagc tagagggagt	1020
gataaggatg cgaaaatcat tatggaagct aaacctggat atgctttagt tggatttgaa	1080
ataagtaagg attcaattgc agtattaaaa gtttatcagg caaagctaaa acacaactat	1140
caaattgata aggattcggt atcagaaatt gtttatgggtg atatagataa attattatgt	1200
ccggatcaat ctgaacaaat gtattataca aataaaatag catttccaaa tgaatatgtt	1260
atcactaaaa ttgcttttac taaaaaactg aacagtttaa gatatgaggt cacagcgaat	1320
ttttatgact cttctacagg agatattgat ctaaataaga aaaaaataga atcaagtga	1380
gcggagttta gtatgctaaa tgctaataat gatgggtgtt atatgccgat aggtactata	1440
agtgaacat ttttgactcc aattaatgga tttggcctcg tagtcgatga aaattcaaga	1500
ctagtaactt tgacatgtaa atcatattta agagagacat tgtagcaac agacttaagt	1560
aataaagaaa ctaaactgat tgtccacct aatggtttta ttagcaatat tgtagaaaat	1620
gggaacttag agggagaaaa cttagagccg tggaaagcaa ataacaaaaa tgcgtatgta	1680
gatcataccg gaggtgtaaa tggaactaaa gttttatatg ttcatgagga tggtgagttc	1740
tcacaattta ttggggataa attgaaattg aaaacagaat atgtaattca atatattgta	1800
aagggaaaag ctgctattta tttaaaagat gaaaaaatg gggattacat ttatgaagaa	1860
acaaataatg aattagaaga ttttcaagct gtactaaac gttttattac gggaacagat	1920
tcttcaagag ttcatttaat ttttaccagt caaatggcg aggaagcatt tggaggaaac	1980
tttattattt cagaaattag gccatccgaa gagttattaa gtccagaatt gattaagtcg	2040
gatgcttggg ttggatctca gggaacttgg atctcaggaa attctctcaa tattaatagt	2100
aatgtaaatg gaacctttcg acaaacctt tcgttagaaa gttattcaac ctatagtatg	2160
aactttaatg tgaatggatt tggcaaggtg acaataagaa attctcgtga agtagtattt	2220
gaaaggagtt atctacagtt ttcctctaaa tatatttcag aaaaattcac aacaacaacc	2280

aataatactg gggtatatgt agaactttct cgtgcttcgt ctaggggagt tataaatttc 2340

ggagattttt caatcaagta a 2361

<210> 17

<211> 786

<212> PRT

<213> *Bacillus thuringiensis*

<400> 17

Met Gln Lys Asn Asn Lys Leu Ser Val Lys Ala Leu Pro Ser Phe Ile
1 5 10 15

Asp Tyr Phe Asn Gly Ile Tyr Gly Phe Ala Thr Gly Ile Lys Asp Ile
20 25 30

Met Asn Met Ile Phe Lys Thr Asn Thr Gly Gly Asp Leu Thr Leu Asp
35 40 45

Glu Ile Leu Lys Asn Gln Gln Leu Leu Asn Glu Ile Ser Gly Lys Leu
50 55 60

Asp Gly Val Asn Gly Ser Leu Asn Asp Leu Leu Ala Gln Gly Asn Leu
65 70 75 80

Asp Thr Glu Leu Ser Lys Glu Ile Leu Lys Ile Ala Asn Glu Gln Asn
85 90 95

Lys Val Leu Asn Asp Val Asn Thr Lys Leu Asp Ala Ile Asn Leu Met
100 105 110

Leu Asn Thr Tyr Leu Pro Lys Ile Thr Ser Met Leu Ser Asp Val Met
115 120 125

Lys Gln Asn Tyr Ala Leu Gly Leu Gln Ile Glu Tyr Leu Ser Lys Gln
130 135 140

Leu Lys Glu Ile Ser Asp Lys Leu Asp Val Ile Asn Val Asn Val Leu
145 150 155 160

Ile Asn Ser Thr Leu Thr Glu Ile Thr Pro Ala Tyr Gln Arg Ile Lys
165 170 175

Tyr Val Asn Glu Lys Phe Glu Ala Leu Thr Ser Ala Thr Glu Thr Asn
 180 185 190

Leu Lys Thr Lys Gln Asp Ser Ser His Thr Asp Ile Leu Asp Glu Leu
 195 200 205

Thr Glu Leu Thr Glu Leu Ala Lys Ser Val Thr Lys Asn Asp Val Asp
 210 215 220

Gly Phe Glu Phe Tyr Leu Asn Thr Phe His Asp Val Met Ile Gly Asn
 225 230 235 240

Asn Leu Phe Gly Arg Ser Ala Leu Lys Thr Ala Ser Glu Leu Ile Ala
 245 250 255

Lys Glu Asn Leu Lys Thr Ser Gly Ser Glu Val Gly Asn Val Tyr Asn
 260 265 270

Phe Leu Ile Val Leu Thr Ala Leu Gln Ala Lys Ala Phe Leu Thr Leu
 275 280 285

Thr Thr Cys Arg Lys Leu Leu Gly Leu Ala Asp Ile Asp Tyr Thr Pro
 290 295 300

Ile Met Asn Glu His Leu Asn Lys Glu Lys Glu Glu Phe Arg Val Asn
 305 310 315 320

Ile Leu Pro Thr Leu Ser Asn Thr Phe Ser Asn Pro Asn Tyr Glu Lys
 325 330 335

Ala Arg Gly Ser Asp Lys Asp Ala Lys Ile Ile Met Glu Ala Lys Pro
 340 345 350

Gly Tyr Ala Leu Val Gly Phe Glu Ile Ser Lys Asp Ser Ile Ala Val
 355 360 365

Leu Lys Val Tyr Gln Ala Lys Leu Lys His Asn Tyr Gln Ile Asp Lys
 370 375 380

Asp Ser Leu Ser Glu Ile Val Tyr Gly Asp Ile Asp Lys Leu Leu Cys
 385 390 395 400

Pro Asp Gln Ser Glu Gln Met Tyr Tyr Thr Asn Lys Ile Ala Phe Pro
 405 410 415

Asn Glu Tyr Val Ile Thr Lys Ile Ala Phe Thr Lys Lys Leu Asn Ser
 420 425 430

Leu Arg Tyr Glu Val Thr Ala Asn Phe Tyr Asp Ser Ser Thr Gly Asp
 435 440 445

Ile Asp Leu Asn Lys Lys Lys Ile Glu Ser Ser Glu Ala Glu Phe Ser
 450 455 460

Met Leu Asn Ala Asn Asn Asp Gly Val Tyr Met Pro Ile Gly Thr Ile
 465 470 475 480

Ser Glu Thr Phe Leu Thr Pro Ile Asn Gly Phe Gly Leu Val Val Asp
 485 490 495

Glu Asn Ser Arg Leu Val Thr Leu Thr Cys Lys Ser Tyr Leu Arg Glu
 500 505 510

Thr Leu Leu Ala Thr Asp Leu Ser Asn Lys Glu Thr Lys Leu Ile Val
 515 520 525

Pro Pro Asn Gly Phe Ile Ser Asn Ile Val Glu Asn Gly Asn Leu Glu
 530 535 540

Gly Glu Asn Leu Glu Pro Trp Lys Ala Asn Asn Lys Asn Ala Tyr Val
 545 550 555 560

Asp His Thr Gly Gly Val Asn Gly Thr Lys Val Leu Tyr Val His Glu
 565 570 575

Asp Gly Glu Phe Ser Gln Phe Ile Gly Asp Lys Leu Lys Leu Lys Thr
 580 585 590

Glu Tyr Val Ile Gln Tyr Ile Val Lys Gly Lys Ala Ala Ile Tyr Leu
 595 600 605

Lys Asp Glu Lys Asn Gly Asp Tyr Ile Tyr Glu Glu Thr Asn Asn Glu
 610 615 620

Leu Glu Asp Phe Gln Ala Val Thr Lys Arg Phe Ile Thr Gly Thr Asp
625 630 635 640

Ser Ser Arg Val His Leu Ile Phe Thr Ser Gln Asn Gly Glu Glu Ala
645 650 655

Phe Gly Gly Asn Phe Ile Ile Ser Glu Ile Arg Pro Ser Glu Glu Leu
660 665 670

Leu Ser Pro Glu Leu Ile Lys Ser Asp Ala Trp Val Gly Ser Gln Gly
675 680 685

Thr Trp Ile Ser Gly Asn Ser Leu Asn Ile Asn Ser Asn Val Asn Gly
690 695 700

Thr Phe Arg Gln Asn Leu Ser Leu Glu Ser Tyr Ser Thr Tyr Ser Met
705 710 715 720

Asn Phe Asn Val Asn Gly Phe Gly Lys Val Thr Ile Arg Asn Ser Arg
725 730 735

Glu Val Val Phe Glu Arg Ser Tyr Leu Gln Phe Ser Ser Lys Tyr Ile
740 745 750

Ser Glu Lys Phe Thr Thr Thr Thr Asn Asn Thr Gly Leu Tyr Val Glu
755 760 765

Leu Ser Arg Ala Ser Ser Arg Gly Val Ile Asn Phe Gly Asp Phe Ser
770 775 780

Ile Lys
785

<210> 18

<211> 2361

<212> DNA

<213> Bacillus thuringiensis

<400> 18

atgaatatga ataatactaa attaaacgca agggccctac cgagttttat tgattatattt 60

aatggcattt atggatttgc cactgggtatc aaagacatta tgaatatgat ttttaaaacg 120

gatacaggtg gtaatctaac cttagacgaa atcctaaaga atcagcagtt actaaatgag 180

atttctggta aattggatgg ggtaaattgg agcttaaattg atcttatcgc acagggaaac 240

ttaaatacag aattagctaa gcaaacttta aaagttgcaa atgaacaaaa tcaagtttta	300
aatgatgtta ataacaaact agatgcgata aattcgatgc ttaaaatata tctacctaaa	360
attacatcta tgttaagtga tgtaatgaag caaaattatg tgctaagctt gcaaatagaa	420
tacttaagta aacaattgca agaaatctcc gacaagctag atattattaa cgtaaatgtg	480
cttattaact ctacgcttac tgaaattaca cctgcgtatc aacgaattaa atatgtgaat	540
gaaaaatttg acgatttaac ttttgctaca gaaaacactt taaaagtaaa aaaggatagc	600
tctcctgctg atattcttga cgagttaact gaattaactg aactagcgaa aagtgttaca	660
aaaaatgacg tggatgggtt tgaattttac cttaatacat tccatgatgt aatgggtggga	720
aataatttat tcggtcgttc agcttttaaaa actgcttcgg aattaattgc taaagaaaat	780
gtgaaaacaa gtggcagtga agtaggaaat gtttataatt tcttaattgt attaacagct	840
ctacaagcaa aagcttttct tactttaaca acatgccgaa aattattagg cttagcagat	900
attgattata cttctatcat gaatgagcat ttaaataagg aaaaagagga atttagagta	960
aacatccttc ccacactttc taataccttt tctaactcta attatgcaaa agctaaggga	1020
agtaatgaag atacaaagat gattgtggaa gctaaaccag gatatgtttt gggtggattt	1080
gaaatgagca ataattcaat tacagtatta aaagcatatc aagctaagct aaaaaagat	1140
tatcaaattg ataaggattc gttatcagaa ataatatata gtgatacgga taaattatta	1200
tgtccggatc aatctgaaca aatatattat acaaagaaca tagcatttcc aaatgaatat	1260
gttattacta aaattgcttt tactaaaaaa atgaacagtt taaggatatga ggcgacagcg	1320
aatttttatg attcttctac aggggatatt gatctaaata agacaaaagt agaatcaagt	1380
gaagcggagt atagtatgct aaaagctagt gatgatgaag ttacatgcc gctaggtctt	1440
atcagtgaaa catTTTTTaaa tccaattaat ggatttaggc ttgcagtcga tgaaaattcc	1500
agactagtaa ctttaacatg tagatcatat ttaagagaga cattgttagc gacagattta	1560
aataataaag aaactaaatt gattgtccca cctaattgtt ttattagcaa tattgtagag	1620
aatggaaata tagaaatgga caccttagaa ccatggaagg caaataatga gaatgcgaat	1680
gtagattatt caggcggagt gaatggaact agagctttat atgttcataa ggatggtgaa	1740
ttctcacatt ttattggaga caagttgaaa tctaaaacag aatacttgat tcgatatatt	1800
gtaaaaggaa aagcttctat ttttttaaaa gatgaaaaaa atgaaaatta catttacgag	1860
gatacaaata ataatttaga agattatcaa actattacta aacgttttac tacaggaaact	1920

gattcgacag gagtttattt aatttttaaat agtcaaaatg gagatgaagc ttgggggagat 1980
 aactttatta ttttggaaat tagtccgtgt gaaaagttat taagtccaga attaattaaa 2040
 acagataaat ggattagtagc gggatcgact tatattagcg atgatagact cactctttat 2100
 cagggaggac gaggaatttt aaagcaaaac cttcaattag atcgtttttc aacttataga 2160
 gtcaattttt ctgtgaacgg agatgctaata gtaaggattc gtaattctag ggaagtgtta 2220
 cttgaaaaaa gatatttgaa ccgtaaaggt gtttctgaaa tgttcactac aaaatttgat 2280
 aaagataact tttatgtaga gctttctcaa ggggataatc ttggtactgt tgtacatttt 2340
 tatgatttct ctattaaata a 2361

<210> 19
 <211> 786
 <212> PRT
 <213> *Bacillus thuringiensis*

<400> 19

Met Asn Met Asn Asn Thr Lys Leu Asn Ala Arg Ala Leu Pro Ser Phe
 1 5 10 15

Ile Asp Tyr Phe Asn Gly Ile Tyr Gly Phe Ala Thr Gly Ile Lys Asp
 20 25 30

Ile Met Asn Met Ile Phe Lys Thr Asp Thr Gly Gly Asn Leu Thr Leu
 35 40 45

Asp Glu Ile Leu Lys Asn Gln Gln Leu Leu Asn Glu Ile Ser Gly Lys
 50 55 60

Leu Asp Gly Val Asn Gly Ser Leu Asn Asp Leu Ile Ala Gln Gly Asn
 65 70 75 80

Leu Asn Thr Glu Leu Ala Lys Gln Ile Leu Lys Val Ala Asn Glu Gln
 85 90 95

Asn Gln Val Leu Asn Asp Val Asn Asn Lys Leu Asp Ala Ile Asn Ser
 100 105 110

Met Leu Lys Ile Tyr Leu Pro Lys Ile Thr Ser Met Leu Ser Asp Val
 115 120 125

Met Lys Gln Asn Tyr Val Leu Ser Leu Gln Ile Glu Tyr Leu Ser Lys
 130 135 140

Gln Leu Gln Glu Ile Ser Asp Lys Leu Asp Ile Ile Asn Val Asn Val
 145 150 155 160

Leu Ile Asn Ser Thr Leu Thr Glu Ile Thr Pro Ala Tyr Gln Arg Ile
 165 170 175

Lys Tyr Val Asn Glu Lys Phe Asp Asp Leu Thr Phe Ala Thr Glu Asn
 180 185 190

Thr Leu Lys Val Lys Lys Asp Ser Ser Pro Ala Asp Ile Leu Asp Glu
 195 200 205

Leu Thr Glu Leu Thr Glu Leu Ala Lys Ser Val Thr Lys Asn Asp Val
 210 215 220

Asp Gly Phe Glu Phe Tyr Leu Asn Thr Phe His Asp Val Met Val Gly
 225 230 235 240

Asn Asn Leu Phe Gly Arg Ser Ala Leu Lys Thr Ala Ser Glu Leu Ile
 245 250 255

Ala Lys Glu Asn Val Lys Thr Ser Gly Ser Glu Val Gly Asn Val Tyr
 260 265 270

Asn Phe Leu Ile Val Leu Thr Ala Leu Gln Ala Lys Ala Phe Leu Thr
 275 280 285

Leu Thr Thr Cys Arg Lys Leu Leu Gly Leu Ala Asp Ile Asp Tyr Thr
 290 295 300

Ser Ile Met Asn Glu His Leu Asn Lys Glu Lys Glu Glu Phe Arg Val
 305 310 315 320

Asn Ile Leu Pro Thr Leu Ser Asn Thr Phe Ser Asn Pro Asn Tyr Ala
 325 330 335

Lys Ala Lys Gly Ser Asn Glu Asp Thr Lys Met Ile Val Glu Ala Lys
 340 345 350

Pro Gly Tyr Val Leu Val Gly Phe Glu Met Ser Asn Asn Ser Ile Thr
 355 360 365

Val Leu Lys Ala Tyr Gln Ala Lys Leu Lys Lys Asp Tyr Gln Ile Asp
 370 375 380

Lys Asp Ser Leu Ser Glu Ile Ile Tyr Ser Asp Thr Asp Lys Leu Leu
 385 390 395 400

Cys Pro Asp Gln Ser Glu Gln Ile Tyr Tyr Thr Lys Asn Ile Ala Phe
 405 410 415

Pro Asn Glu Tyr Val Ile Thr Lys Ile Ala Phe Thr Lys Lys Met Asn
 420 425 430

Ser Leu Arg Tyr Glu Ala Thr Ala Asn Phe Tyr Asp Ser Ser Thr Gly
 435 440 445

Asp Ile Asp Leu Asn Lys Thr Lys Val Glu Ser Ser Glu Ala Glu Tyr
 450 455 460

Ser Met Leu Lys Ala Ser Asp Asp Glu Val Tyr Met Pro Leu Gly Leu
 465 470 475 480

Ile Ser Glu Thr Phe Leu Asn Pro Ile Asn Gly Phe Arg Leu Ala Val
 485 490 495

Asp Glu Asn Ser Arg Leu Val Thr Leu Thr Cys Arg Ser Tyr Leu Arg
 500 505 510

Glu Thr Leu Leu Ala Thr Asp Leu Asn Asn Lys Glu Thr Lys Leu Ile
 515 520 525

Val Pro Pro Asn Val Phe Ile Ser Asn Ile Val Glu Asn Gly Asn Ile
 530 535 540

Glu Met Asp Thr Leu Glu Pro Trp Lys Ala Asn Asn Glu Asn Ala Asn
 545 550 555 560

Val Asp Tyr Ser Gly Gly Val Asn Gly Thr Arg Ala Leu Tyr Val His
 565 570 575

Lys Asp Gly Glu Phe Ser His Phe Ile Gly Asp Lys Leu Lys Ser Lys
 580 585 590

Thr Glu Tyr Leu Ile Arg Tyr Ile Val Lys Gly Lys Ala Ser Ile Phe
 595 600 605

Leu Lys Asp Glu Lys Asn Glu Asn Tyr Ile Tyr Glu Asp Thr Asn Asn
 610 615 620

Asn Leu Glu Asp Tyr Gln Thr Ile Thr Lys Arg Phe Thr Thr Gly Thr
 625 630 635 640

Asp Ser Thr Gly Val Tyr Leu Ile Phe Asn Ser Gln Asn Gly Asp Glu
 645 650 655

Ala Trp Gly Asp Asn Phe Ile Ile Leu Glu Ile Ser Pro Cys Glu Lys
 660 665 670

Leu Leu Ser Pro Glu Leu Ile Lys Thr Asp Lys Trp Ile Ser Thr Gly
 675 680 685

Ser Thr Tyr Ile Ser Asp Asp Arg Leu Thr Leu Tyr Gln Gly Gly Arg
 690 695 700

Gly Ile Leu Lys Gln Asn Leu Gln Leu Asp Arg Phe Ser Thr Tyr Arg
 705 710 715 720

Val Asn Phe Ser Val Asn Gly Asp Ala Asn Val Arg Ile Arg Asn Ser
 725 730 735

Arg Glu Val Leu Leu Glu Lys Arg Tyr Leu Asn Arg Lys Gly Val Ser
 740 745 750

Glu Met Phe Thr Thr Lys Phe Asp Lys Asp Asn Phe Tyr Val Glu Leu
 755 760 765

Ser Gln Gly Asp Asn Leu Gly Thr Val Val His Phe Tyr Asp Phe Ser
 770 775 780

Ile Lys
 785

<210> 20

<211> 17
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> SUP-1A forward primer

<400> 20
 ggattcgta tcagaaa

17

<210> 21
 <211> 17
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> SUP-1B reverse primer

<400> 21
 ctgtygctaa caatgtc

17

<210> 22
 <211> 47
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> SUP primer

<400> 22
 gctctagaag gaggtactt atgaacaaga ataatactaa attaagc

47

<210> 23
 <211> 27
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> SUP primer

<400> 23
 ggggtacctt acttaataga gacatcg

27

<210> 24
 <211> 2364
 <212> DNA
 <213> Bacillus thuringiensis

<400> 24
 atgaatatga ataatactaa attaaacgca agggccctac cgagttttat tgattatattt

60

aatggcattt atggatttgc cactgggtatc aaagacatta tgaatatgat ttttaaaacg

120

gatacagggtg gtaatctaac cttagacgaa atcctaaaga atcagcagtt actaaatgag	180
atttctggta aattggatgg ggtaaatggg agcttaaattg atcttatcgc acagggaaac	240
ttaaatacag aattatctaa ggaaatctta aaaattgcaa atgaacagaa tcaagtctta	300
aatgatgtta ataacaaact cgatgcgata aatacagatgc ttcatatata tctacctaaa	360
atcacatcta tgttaagtga tgtaatgaag caaaattatg cgctaagtct gcaagtagaa	420
tacttaagta aacaattgaa agaaatttct gataaattag atgttattaa cgtaaattgt	480
cttattaact ctacacttac tgaaattaca cctgcatac aacggattaa atatgtaaat	540
gaaaaatttg aagaattaac ttttgctaca gaaaccactt taaaagtaaa aaaggatagc	600
tcgcctgctg atattcttga cgagttaact gaattaactg aactagcgaa aagtgttaca	660
aaaaatgacg tggatgggtt tgaattttac cttaatatcat tccacgatgt aatggtagga	720
aataatttat tcgggcgttc agctttaaaa actgcttcag aattaattgc taaagaaaat	780
gtgaaaacaa gtggcagtga agtaggaaat gtttataatt tcttaattgt attaacagct	840
ctacaagcaa aagcttttct tactttaaca acatgccgaa aattattagg cttagcagat	900
attgattata catctattat gaatgaacat ttaaataagg aaaaagagga atttagagta	960
aacatccttc ctacactttc taatactttt tctaactcta attatgcaaa agttaaaagga	1020
agtgatgaag atgcaaagat gattgtggaa gctaaaccag gacatgcatt ggttgggtt	1080
gaaattagta atgattcaat gacagtatta aaagtatatg aagctaagct aaaacaaaat	1140
taccaagttg ataaggattc cttatcggaa gtcatttata gtgatatgga taaattattg	1200
tgcccagatc aatctgaaca aatttattat acaaataata tagtatttcc aatgaatat	1260
gtaattacta aaattgattt tactaagaaa atgaaaactt taagatatga ggtaacagct	1320
aattcttacg attcttctac aggagaaatt gacttaaata agaagaaagt agaatcaagt	1380
gaagcggagt ataggacgtt aagtgctaata aatgatggag tatatatgcc gttaggtgtc	1440
atcagtgaaa catttttgac tccaattaat ggatttggcc tccaagctga tgaaaattca	1500
agattaatta ctttaacatg taaatcatat ttaagggaac tactactagc gacagactta	1560
agcaataaag aaactaaatt gattgtcccg cctattagtt ttattagtaa tattgtagaa	1620
aatgggaact tagagggaga aaacttagag ccgtggatag caaataacaa aatgcgtat	1680
gtagatcata caggtggtat aaatggaact aaagttttat atgttcataa ggatgggtgag	1740
ttttcacaat ttgttggagg taagttaaaa tcgaaaacag aatatgtaat tcaatatatt	1800
gtaaagggaa aagcttctat ttatttaaaa gataaaaaaa atgagaattc catttatgaa	1860

gaaataaata atgatttaga aggttttcaa actgttacta aacgttttat tacaggaacg 1920
 gattcttcag ggattcattt aatttttacc agtcaaaatg gcgagggagc atttgaggga 1980
 aactttatta tctcagaaat taggacatcc gaagagttat taagtccaga attgattatg 2040
 tcggatgctt ggggttgatc ccagggaact tggatctcag gaaattctct cactattaat 2100
 agtaatgtaa atggaacctt tcgacaaaat cttccgttag aaagttattc aacctatagt 2160
 atgaacttta ctgtgaatgg atttggcaag gtgacagtaa gaaattctcg tgaagtatta 2220
 tttgaaaaaa gttatccgca gctttcacct aaagatattt ctgaaaaatt tacaactgca 2280
 gccataata ccggattata tgtagagctt tctcgctcaa cgtcgggtgg tgcaataaat 2340
 ttccgagatt tttcaattaa gtaa 2364

<210> 25
 <211> 787
 <212> PRT
 <213> *Bacillus thuringiensis*

<400> 25

Met Asn Met Asn Asn Thr Lys Leu Asn Ala Arg Ala Leu Pro Ser Phe
1 5 10 15

Ile Asp Tyr Phe Asn Gly Ile Tyr Gly Phe Ala Thr Gly Ile Lys Asp
20 25 30

Ile Met Asn Met Ile Phe Lys Thr Asp Thr Gly Gly Asn Leu Thr Leu
35 40 45

Asp Glu Ile Leu Lys Asn Gln Gln Leu Leu Asn Glu Ile Ser Gly Lys
50 55 60

Leu Asp Gly Val Asn Gly Ser Leu Asn Asp Leu Ile Ala Gln Gly Asn
65 70 75 80

Leu Asn Thr Glu Leu Ser Lys Glu Ile Leu Lys Ile Ala Asn Glu Gln
85 90 95

Asn Gln Val Leu Asn Asp Val Asn Asn Lys Leu Asp Ala Ile Asn Thr
100 105 110

Met Leu His Ile Tyr Leu Pro Lys Ile Thr Ser Met Leu Ser Asp Val
115 120 125

Met Lys Gln Asn Tyr Ala Leu Ser Leu Gln Val Glu Tyr Leu Ser Lys
 130 135 140

Gln Leu Lys Glu Ile Ser Asp Lys Leu Asp Val Ile Asn Val Asn Val
 145 150 155 160

Leu Ile Asn Ser Thr Leu Thr Glu Ile Thr Pro Ala Tyr Gln Arg Ile
 165 170 175

Lys Tyr Val Asn Glu Lys Phe Glu Glu Leu Thr Phe Ala Thr Glu Thr
 180 185 190

Thr Leu Lys Val Lys Lys Asp Ser Ser Pro Ala Asp Ile Leu Asp Glu
 195 200 205

Leu Thr Glu Leu Thr Glu Leu Ala Lys Ser Val Thr Lys Asn Asp Val
 210 215 220

Asp Gly Phe Glu Phe Tyr Leu Asn Thr Phe His Asp Val Met Val Gly
 225 230 235 240

Asn Asn Leu Phe Gly Arg Ser Ala Leu Lys Thr Ala Ser Glu Leu Ile
 245 250 255

Ala Lys Glu Asn Val Lys Thr Ser Gly Ser Glu Val Gly Asn Val Tyr
 260 265 270

Asn Phe Leu Ile Val Leu Thr Ala Leu Gln Ala Lys Ala Phe Leu Thr
 275 280 285

Leu Thr Thr Cys Arg Lys Leu Leu Gly Leu Ala Asp Ile Asp Tyr Thr
 290 295 300

Ser Ile Met Asn Glu His Leu Asn Lys Glu Lys Glu Glu Phe Arg Val
 305 310 315 320

Asn Ile Leu Pro Thr Leu Ser Asn Thr Phe Ser Asn Pro Asn Tyr Ala
 325 330 335

Lys Val Lys Gly Ser Asp Glu Asp Ala Lys Met Ile Val Glu Ala Lys
 340 345 350

Pro Gly His Ala Leu Val Gly Phe Glu Ile Ser Asn Asp Ser Met Thr
 355 360 365

Val Leu Lys Val Tyr Glu Ala Lys Leu Lys Gln Asn Tyr Gln Val Asp
 370 375 380

Lys Asp Ser Leu Ser Glu Val Ile Tyr Ser Asp Met Asp Lys Leu Leu
 385 390 395 400

Cys Pro Asp Gln Ser Glu Gln Ile Tyr Tyr Thr Asn Asn Ile Val Phe
 405 410 415

Pro Asn Glu Tyr Val Ile Thr Lys Ile Asp Phe Thr Lys Lys Met Lys
 420 425 430

Thr Leu Arg Tyr Glu Val Thr Ala Asn Ser Tyr Asp Ser Ser Thr Gly
 435 440 445

Glu Ile Asp Leu Asn Lys Lys Lys Val Glu Ser Ser Glu Ala Glu Tyr
 450 455 460

Arg Thr Leu Ser Ala Asn Asn Asp Gly Val Tyr Met Pro Leu Gly Val
 465 470 475 480

Ile Ser Glu Thr Phe Leu Thr Pro Ile Asn Gly Phe Gly Leu Gln Ala
 485 490 495

Asp Glu Asn Ser Arg Leu Ile Thr Leu Thr Cys Lys Ser Tyr Leu Arg
 500 505 510

Glu Leu Leu Leu Ala Thr Asp Leu Ser Asn Lys Glu Thr Lys Leu Ile
 515 520 525

Val Pro Pro Ile Ser Phe Ile Ser Asn Ile Val Glu Asn Gly Asn Leu
 530 535 540

Glu Gly Glu Asn Leu Glu Pro Trp Ile Ala Asn Asn Lys Asn Ala Tyr
 545 550 555 560

Val Asp His Thr Gly Gly Ile Asn Gly Thr Lys Val Leu Tyr Val His
 565 570 575

Lys Asp Gly Glu Phe Ser Gln Phe Val Gly Gly Lys Leu Lys Ser Lys
 580 585 590

Thr Glu Tyr Val Ile Gln Tyr Ile Val Lys Gly Lys Ala Ser Ile Tyr
 595 600 605

Leu Lys Asp Lys Lys Asn Glu Asn Ser Ile Tyr Glu Glu Ile Asn Asn
 610 615 620

Asp Leu Glu Gly Phe Gln Thr Val Thr Lys Arg Phe Ile Thr Gly Thr
 625 630 635 640

Asp Ser Ser Gly Ile His Leu Ile Phe Thr Ser Gln Asn Gly Glu Gly
 645 650 655

Ala Phe Gly Gly Asn Phe Ile Ile Ser Glu Ile Arg Thr Ser Glu Glu
 660 665 670

Leu Leu Ser Pro Glu Leu Ile Met Ser Asp Ala Trp Val Gly Ser Gln
 675 680 685

Gly Thr Trp Ile Ser Gly Asn Ser Leu Thr Ile Asn Ser Asn Val Asn
 690 695 700

Gly Thr Phe Arg Gln Asn Leu Pro Leu Glu Ser Tyr Ser Thr Tyr Ser
 705 710 715 720

Met Asn Phe Thr Val Asn Gly Phe Gly Lys Val Thr Val Arg Asn Ser
 725 730 735

Arg Glu Val Leu Phe Glu Lys Ser Tyr Pro Gln Leu Ser Pro Lys Asp
 740 745 750

Ile Ser Glu Lys Phe Thr Thr Ala Ala Asn Asn Thr Gly Leu Tyr Val
 755 760 765

Glu Leu Ser Arg Ser Thr Ser Gly Gly Ala Ile Asn Phe Arg Asp Phe
 770 775 780

Ser Ile Lys
 785

<210> 26

<211> 2367

<212> DNA

<213> *Bacillus thuringiensis*

<400> 26

```

atggctaaca tgaacaacac caagctcaac gcccgcgccc tcccatcctt cattgactac      60
ttcaacggca tctacggctt cgccactggc atcaaggaca tcatgaacat gatcttcaag      120
actgacactg gtggcaacct caccttggat gagatcctca agaaccagca gtcctcaac      180
gagatctctg gcaagttgga tgggtgtcaac ggctccctca acgacctcat tgcccagggc      240
aacctcaaca ctgagctttc caaggagatc ctcaaaattg ccaacgagca gaaccaggtc      300
ctcaacgatg tcaacaacaa gttggatgcc atcaacacca tgctccacat ctatctccca      360
aaaatcacct ccatgctctc tgatgtcatg aagcagaact acgccctctc cctccaagtg      420
gagtacctct ccaagcagct caaggaaatt tctgacaagt tggatgtgat caacgtcaac      480
gtcctcatca actccaccct cactgagatc actccagcct atcagaggat caagtacgtc      540
aacgagaagt tcgaggagct tactttcgcc actgagacca ccctcaaggt caagaaggac      600
tccagcccag ctgacatctt ggatgagctt actgagctta ctgagttggc caagtctgtc      660
accaagaacg atgtggatgg cttcgagttc tacctcaaca cttccacga tgtcatggtg      720
ggcaacaact tgttcggccg ttctgccttc aagactgcct ctgaattgat cgcaaaggag      780
aacgtcaaga cctctggctc tgagggtgggc aacgtctaca acttctcat tgtcctcact      840
gccctccaag ccaaggcctt cctcaccctc accacctgtc gtaagctctt gggcttggct      900
gacattgact acacctccat catgaacgag cacctcaaca aggagaagga ggagttccgt      960
gtcaacatcc tcccaaccct ctccaacacc ttctccaacc caaactacgc caaggtcaag     1020
ggctctgatg aggatgcaa gatgattgtg gaggccaagc ccggccacgc ccttgtgggc     1080
ttcgagatct ccaacgactc catgactgtc ctcaaggtct acgaggccaa gctcaagcag     1140
aactaccagg tggacaagga ctccctctcc gaggtcatct actccgacat ggacaagctc     1200
ctctgcccag accagtccga gcagatctac tacaccaaca acatcgtgtt cccaaacgag     1260
tacgtcatca ccaaaaattga cttcaccaag aagatgaaaa ccctccgtta cgaggtcact     1320
gccaactcct acgactcctc cactgggtgag attgacctca acaagaagaa ggtggagtcc     1380
tctgaggctg agtaccgtac cctctctgcc aacaacgatg gtgtctacat gcccttgggt     1440
gtgatctctg agaccttctt cactcctatc aacggtttcg gcctccaagc tgatgaaaat     1500
tcacgtctca tcacctcac ttgtaagtcc tatctcaggg agttgctctt ggccactgac     1560

```

```

ctctccaaca aggagaccaa gctcattgtc ccacccatct ccttcatctc caacattgtg 1620
gagaacggca acttggaggg tgagaacttg gagccttggg ttgccaacaa caagaacgcc 1680
tacgtggacc aactgggtgg catcaacggc accaaggtcc tctacgtcca caaggatggt 1740
gagttctccc agttcgtggg tggcaagttg aagtccaaga ctgagtacgt catccagtac 1800
attgtcaagg gcaaggcctc catctatctc aaggacaaga aaaatgagaa ctccatctac 1860
gaggagatca acaacgactt ggagggcttc cagactgtca ccaagagggt catcactggc 1920
actgactcct ctggcatcca cctcatcttc acctccaga acggtgaggg tgctttcggg 1980
ggcaacttca taatctctga gatcaggacc tctgaggagc ttctctctcc cgagcttacc 2040
atgtctgatg cctgggttgg ctcccagggc acttggatct ctggcaactc cctcaccatc 2100
aactccaacg tcaacggcac ctcccgccag aacctcccat tggagtcta ctccacctac 2160
tccatgaact tcaactgtcaa cggtttcggc aaggtcactg tcaggaactc ccgtgaggtc 2220
ctcttcgaga agtcctaccc acagctctct cccaaggaca tctctgagaa gttcaccact 2280
gctgccaaca aactggcct ctacgtggag ctttcccggt ccacctctgg tggtgccatc 2340
aacttccgtg acttctccat caagtga 2367

```

```

<210> 27
<211> 788
<212> PRT
<213> Bacillus thuringiensis

```

```

<400> 27

```

```

Met Ala Asn Met Asn Asn Thr Lys Leu Asn Ala Arg Ala Leu Pro Ser
1          5          10          15

```

```

Phe Ile Asp Tyr Phe Asn Gly Ile Tyr Gly Phe Ala Thr Gly Ile Lys
20          25          30

```

```

Asp Ile Met Asn Met Ile Phe Lys Thr Asp Thr Gly Gly Asn Leu Thr
35          40          45

```

```

Leu Asp Glu Ile Leu Lys Asn Gln Gln Leu Leu Asn Glu Ile Ser Gly
50          55          60

```

```

Lys Leu Asp Gly Val Asn Gly Ser Leu Asn Asp Leu Ile Ala Gln Gly
65          70          75          80

```

Asn Leu Asn Thr Glu Leu Ser Lys Glu Ile Leu Lys Ile Ala Asn Glu
 85 90 95

Gln Asn Gln Val Leu Asn Asp Val Asn Asn Lys Leu Asp Ala Ile Asn
 100 105 110

Thr Met Leu His Ile Tyr Leu Pro Lys Ile Thr Ser Met Leu Ser Asp
 115 120 125

Val Met Lys Gln Asn Tyr Ala Leu Ser Leu Gln Val Glu Tyr Leu Ser
 130 135 140

Lys Gln Leu Lys Glu Ile Ser Asp Lys Leu Asp Val Ile Asn Val Asn
 145 150 155 160

Val Leu Ile Asn Ser Thr Leu Thr Glu Ile Thr Pro Ala Tyr Gln Arg
 165 170 175

Ile Lys Tyr Val Asn Glu Lys Phe Glu Glu Leu Thr Phe Ala Thr Glu
 180 185 190

Thr Thr Leu Lys Val Lys Lys Asp Ser Ser Pro Ala Asp Ile Leu Asp
 195 200 205

Glu Leu Thr Glu Leu Thr Glu Leu Ala Lys Ser Val Thr Lys Asn Asp
 210 215 220

Val Asp Gly Phe Glu Phe Tyr Leu Asn Thr Phe His Asp Val Met Val
 225 230 235 240

Gly Asn Asn Leu Phe Gly Arg Ser Ala Leu Lys Thr Ala Ser Glu Leu
 245 250 255

Ile Ala Lys Glu Asn Val Lys Thr Ser Gly Ser Glu Val Gly Asn Val
 260 265 270

Tyr Asn Phe Leu Ile Val Leu Thr Ala Leu Gln Ala Lys Ala Phe Leu
 275 280 285

Thr Leu Thr Thr Cys Arg Lys Leu Leu Gly Leu Ala Asp Ile Asp Tyr
 290 295 300

Thr Ser Ile Met Asn Glu His Leu Asn Lys Glu Lys Glu Glu Phe Arg
 305 310 315 320

Val Asn Ile Leu Pro Thr Leu Ser Asn Thr Phe Ser Asn Pro Asn Tyr
 325 330 335

Ala Lys Val Lys Gly Ser Asp Glu Asp Ala Lys Met Ile Val Glu Ala
 340 345 350

Lys Pro Gly His Ala Leu Val Gly Phe Glu Ile Ser Asn Asp Ser Met
 355 360 365

Thr Val Leu Lys Val Tyr Glu Ala Lys Leu Lys Gln Asn Tyr Gln Val
 370 375 380

Asp Lys Asp Ser Leu Ser Glu Val Ile Tyr Ser Asp Met Asp Lys Leu
 385 390 395 400

Leu Cys Pro Asp Gln Ser Glu Gln Ile Tyr Tyr Thr Asn Asn Ile Val
 405 410 415

Phe Pro Asn Glu Tyr Val Ile Thr Lys Ile Asp Phe Thr Lys Lys Met
 420 425 430

Lys Thr Leu Arg Tyr Glu Val Thr Ala Asn Ser Tyr Asp Ser Ser Thr
 435 440 445

Gly Glu Ile Asp Leu Asn Lys Lys Lys Val Glu Ser Ser Glu Ala Glu
 450 455 460

Tyr Arg Thr Leu Ser Ala Asn Asn Asp Gly Val Tyr Met Pro Leu Gly
 465 470 475 480

Val Ile Ser Glu Thr Phe Leu Thr Pro Ile Asn Gly Phe Gly Leu Gln
 485 490 495

Ala Asp Glu Asn Ser Arg Leu Ile Thr Leu Thr Cys Lys Ser Tyr Leu
 500 505 510

Arg Glu Leu Leu Leu Ala Thr Asp Leu Ser Asn Lys Glu Thr Lys Leu
 515 520 525

Ile Val Pro Pro Ile Ser Phe Ile Ser Asn Ile Val Glu Asn Gly Asn
530 535 540

Leu Glu Gly Glu Asn Leu Glu Pro Trp Ile Ala Asn Asn Lys Asn Ala
545 550 555 560

Tyr Val Asp His Thr Gly Gly Ile Asn Gly Thr Lys Val Leu Tyr Val
565 570 575

His Lys Asp Gly Glu Phe Ser Gln Phe Val Gly Gly Lys Leu Lys Ser
580 585 590

Lys Thr Glu Tyr Val Ile Gln Tyr Ile Val Lys Gly Lys Ala Ser Ile
595 600 605

Tyr Leu Lys Asp Lys Lys Asn Glu Asn Ser Ile Tyr Glu Glu Ile Asn
610 615 620

Asn Asp Leu Glu Gly Phe Gln Thr Val Thr Lys Arg Phe Ile Thr Gly
625 630 635 640

Thr Asp Ser Ser Gly Ile His Leu Ile Phe Thr Ser Gln Asn Gly Glu
645 650 655

Gly Ala Phe Gly Gly Asn Phe Ile Ile Ser Glu Ile Arg Thr Ser Glu
660 665 670

Glu Leu Leu Ser Pro Glu Leu Ile Met Ser Asp Ala Trp Val Gly Ser
675 680 685

Gln Gly Thr Trp Ile Ser Gly Asn Ser Leu Thr Ile Asn Ser Asn Val
690 695 700

Asn Gly Thr Phe Arg Gln Asn Leu Pro Leu Glu Ser Tyr Ser Thr Tyr
705 710 715 720

Ser Met Asn Phe Thr Val Asn Gly Phe Gly Lys Val Thr Val Arg Asn
725 730 735

Ser Arg Glu Val Leu Phe Glu Lys Ser Tyr Pro Gln Leu Ser Pro Lys
740 745 750

Asp Ile Ser Glu Lys Phe Thr Thr Ala Ala Asn Asn Thr Gly Leu Tyr
755 760 765

Val Glu Leu Ser Arg Ser Thr Ser Gly Gly Ala Ile Asn Phe Arg Asp
770 775 780

Phe Ser Ile Lys
785